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| 09 682,910 | 10/31/2001 | Donald S. Stanton | 109170 | 2935 |

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| EXAMINER |
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JOLLEY, KIRSTEN

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| ART UNIT | PAPER NUMBER |
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1762

DATE MAILED: 08/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/682,910

Applicant(s)

STANTON ET AL.

Examiner

Kirsten Crockford Jolley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,4,7-11,14,15,21 and 22 is/are rejected.
- 7) ☐ Claim(s) 2,3,5,6,12,13,16-18 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

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DETAILED ACTION

Election/Restriction

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-18 and 21-22, drawn to a method of applying an ink-phobic coating to an ejector of an ink jet printhead, classified in class 427, subclass 294.
 - II. Claims 19-20, drawn to a print head, classified in class 347, subclass 45.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another materially different process, for example by inserting a pre-fabricated film of the ink-phobic material and laminating it to the ejector and inside surfaces of the print head.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Chris Brown on June 23, 2003 a provisional election was made with traverse to prosecute the invention of Invention I, claims 1-18 and 21-22. Affirmation of this election must be made by applicant in replying to this Office action. Claims

19-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

6. In the information disclosure statement filed November 13, 2001, a copy of the IBM Technical Disclosure Bulletin was not included with the application file, nor was the Examiner able to locate a copy of the reference. Therefore, the reference has been crossed through on the PTO-1449 and the reference has not been considered. The Examiner will consider the reference if a copy is supplied with Applicant's response.

Specification

7. The use of trademarks have been noted in this application (for example, Dowacil on page 12 or the Orient Chemical Co. dyes listed on page 12). They should be capitalized wherever they appear and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Examiner's Suggestion

8. It is noted that the amorphous fluoropolymer of claim 8 is a *copolymer* of perfluoro(2,2-dimethyl-1,3-dioxole) and tetrafluoroethylene, according to paragraph [0036] on page 9 of the specification. The Examiner suggests adding language into claim 8 to indicate that the amorphous fluoropolymer is a copolymer for clarification purposes.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1, 4, 7-9, 11, 14-15, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyashita et al. (US 5,502,470).

As to claim 1, Miyashita et al. discloses a method of applying an ink-phobic coating to an ejector of an ink jet printhead, whereby the ejector comprises a nozzle plate having one or more openings/apertures through which ink is expelled or ejected. Miyashita et al.'s process comprises the step of immersing the nozzle plate in ink-phobic/water-repellent coating material. The step of immersing the nozzle plate in the coating material inherently meets Applicant's

limitation of "applying the ink-phobic material to an outer surface of the ejector." Additionally, it is the Examiner's position that the immersing step also meets the limitation of "drawing the ink-phobic material through the openings of the ejector to coat the interior of the ejector" because the pressure differential encountered during immersing would draw the coating material into the interior of the ejector openings. Figures 3(a) to 3(c) illustrate that the interior and exterior of the ejector/nozzle plate openings are coated with the water-repellent coating material. As to claim 21, it is the Examiner's position that the step of immersing also meets the limitation of "forcing the ink-phobic material through the openings of the ejector to coat an interior of the ejector with the ink-phobic material" because, as discussed above, the pressure differential encountered during immersing would force the coating material into the interior of the ejector openings.

As to claim 4, Miyashita et al. teaches a step of drying its water-repellent coating material at 120 C after coating at col. 17, lines 1-12.

With respect to claims 7-8, Miyashita et al. teaches using a solution comprising 1% by weight fluoropolymer in its water-repellent coating composition (embodiments described in col. 17 and 21). Additionally, it is known that Miyashita et al. uses an amorphous fluoropolymer, and the amorphous fluoropolymer is a copolymer of perfluoro(2,2-dimethyl-1,3-dioxole) and tetrafluoroethylene, because Miyashita et al. teaches using Du Pont's TEFLON AF as the coating composition; the specification discloses on page 9 that Du Pont's TEFLON AF is a composition comprising the claimed chemicals.

With respect to claim 9, Miyashita et al. teaches that a primer is first applied to the nozzle plate of the ejector prior to coating with the water-repellent/ink-phobic material at col. 6, lines 24-55.

With respect to claim 11, Miyashita et al. discloses that the ejector comprises a nozzle plate having openings/apertures therein, where the apertures/openings are coated with the ink-phobic coating. Figures 10, 12, and 15 illustrate that there are more than one aperture in the ejector/printhead. The top side of nozzle plate 4 in Figures 3(a) to 3(c) is the liquid level control plate.

As to claim 15, Miyashita et al. teaches that in the embodiment described in Example D1 (col. 17), a contact angle with water of 110 degrees is achieved.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. as applied to claims 1, 4, 7-9, 11, 14-15, and 21 above, and further in view of Sharma et al. (US 6,193,352).

Miyashita et al. discloses the use of a coupling agent in col. 6 used as a primer to increase the adhesion of the water-repellent coating. Miyashita et al. teaches that the water-repellent coating material may be Du Pont's TEFLON AF (col. 4, lines 14-16 and col. 17, for example). Miyashita et al. lacks a teaching of the identity of a coupling agent that may be used to increase adhesion. One having ordinary skill in the art would have been motivated to look to the prior art for teachings of specific materials that may be used to enhance the adhesion of Du Pont's TEFLON AF coating to an ink jet printhead nozzle plate.

Sharma et al. is cited for its teaching in col. 3, lines 30-49 of a process of using 1H,1H,2H-perfluorodecyltriethoxysilane (PFDT) by Lancaster Co. as an adhesion promoting layer before applying a solution of Du Pont's TEFLON AF coating. Sharma et al. states that "A Teflon AF surface is representative of a hydrophobic anti-wetting coating that is applied to an ink jet nozzle plate to limit spreading of ink on the nozzle plate." It would have been obvious to have used PFDT as the adhesion promoting layer applied in the process of Miyashita et al., upon seeing the reference of Sharma et al., with the expectation of successful results because the substrate and coating materials taught in Sharma et al. are the same as those taught in Miyashita et al., because Miyashita et al. lacks a teaching of a specific adhesion promoter that may be used,

and additionally because the references are similarly related to coating water-repellent materials on a nozzle plate of an ink jet print head.

14. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. in view of Inoue et al. (US 5,796,415).

Miyashita et al. teaches coating its water-repellent coating by immersion/dipping as discussed in the paragraphs above. Miyashita et al. lacks a teaching of using spraying or pressurized air to apply the water-repellent coating. Inoue et al. is cited for its teaching that water-repellent coatings may be applied by a number of methods, such as spraying, spin coating, immersion, or transfer with an absorbing medium (col. 6, lines 55-67). Inoue et al. notes that when using spraying or spin coating to apply the water-repellent coating, the coating material passes into the openings and onto the internal walls of the discharge port. It would have been obvious for one having ordinary skill in the art to have substituted another water-repellent applying technique, such as spraying, for dipping in the process of Miyashita et al. upon seeing the reference of Inoue et al., with the expectation of successful results because Inoue et al. teaches that spraying and immersion are equivalent means for coating, and particularly since Inoue et al. teaches that spraying results in coating the interior of the openings of the discharge port (because the interior of the openings are desired to be coated in the process of Miyashita et al.) It is the Examiner's position that spraying would inherently meet the limitation of claim 21 of "forcing the ink-phobic material through the openings of the ejector to coat an interior of the ejector." Additionally, as to claim 22, it is noted that an air atomization spray device is a commonly used type of sprayer which uses pressurized air to dispense the coating material. It is

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the Examiner's position that it would have been obvious to one having ordinary skill in the art to have specifically used an air atomized sprayer to coat the water-repellent material in the method of Miyashita et al. because one skill in the art would have desired a sprayer with enough pressure/force to propel the coating material not only onto the ejector's plate, but also into the interior of the nozzle plate openings.

Allowable Subject Matter

15. Claims 2-3, 5-6, 12-13, and 16-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 5 and 18 are allowable over the prior art because the prior art does not teach or fairly suggest the step of using a vacuum to draw an ink-phobic material through the openings of a ink jet printhead ejector to coat an interior of the ejector. While Miyashita et al. teaches coating the interior of an ejector by immersing or by transfer, the reference lacks a teaching or motivation of coating by vacuum drawing. It is additionally noted that the reference of Miyakawa et al. (US 2002/0135636) teaches coating the interior of an ejector within a vacuum chamber of about 133 Torr (paragraph [0149]), however the vacuum of the vacuum chamber does not draw the ink-phobic material through the openings of the ejector.

Claims 6, 12, 13, and 16 are allowable over the prior art because they further limit claim 5, which is allowable for the reasons discussed above.

Claim 2 is allowable over the prior art because the prior art does not teach or fairly suggest a method of first applying the ink-phobic material to an outer surface of the ejector, then

removing an excess of ink-phobic material from the outer surface, and then drawing the ink-phobic material through the openings of the ejector to coat the interior of the ejector. (Claim 2 of "removing an excess of ink-phobic material from the outer surface of the ejector prior to drawing" inherently requires the above steps.) The prior art of record (Miyashita et al. or the references cited in section 16 below) only teach drawing the ink-phobic material through the openings of the ejector via immersion or vapor deposition under vacuum or spin coating to coat both the exterior and interior in a single combined step. It is the Examiner's position that the prior art does not teach and lacks motivation for separating the coating process into two steps of first coating the exterior and then coating the interior, combined with an additional step of removing excess coating material from the exterior of the printhead ejector prior to coating the interior of the ejector. Claim 3 is allowable because it further limits claim 2.

Claim 17 requires a first step of applying ink-phobic material to an outer surface of the ejector by an air atomization spray device, and a second separate step of drawing the ink-phobic material through the openings of the ejector to coat an interior of the ejector using a means for drawing that is separate from the air atomization spray device. Merriam-Webster's Collegiate Dictionary, 10th Edition defines "draw" as to cause to move continuously toward or after a force applied in advance". A step of spraying by an air atomized spray device would not "draw" ink-phobic coating material into the interior of a substrate because a sprayer supplies force from behind and not in advance. Claim 17 is allowable over the prior art because the prior art does not teach or fairly suggest, nor is there motivation for, separating the coating application of ink-phobic material to the surfaces of an ink jet printhead into two separate steps, i.e., first spraying

the exterior of the ejector, and second "drawing" coating material into the interior of the ejector by a different coating means.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Miyakawa et al. (US 2002/0135636) is cited for its teaching of coating both the exterior and interior of an ink jet printhead ejector with an ink-phobic material via vapor deposition in a vacuum chamber (pages 7-8 and paragraph [0174]).

Takemoto et al. (US 6,000,783) and Takemoto et al. (US 6,126,269) are both cited for their teachings of coating the exterior and interior of a printhead ejector with a water-repellent coating (see col. 3, lines 63-67 of Takemoto et al. '783, and col. 3, lines 49-52 of Takemoto et al. '269).

Shimomura et al. (US 5,451,992) is cited for its teaching in col. 7, lines 40-59, that a liquid repellent film may be formed on an exterior surface of a printhead ejector by immersion, transfer by means of an absorbing member, spray coating or spin coating. Shimomura et al. teaches that when using spray coating or spin coating, the interior of the ejector will be coated as well as the exterior.

Karasawa et al. (US 6,467,876) is cited for its teaching of applying a water-repellent coating to a porous surface to form a printhead injector by vacuum deposition.

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17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten Crockford Jolley whose telephone number is 703-306-5461. The examiner can normally be reached on Monday to Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on 703-308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193.

kcj
August 12, 2003

Kirsten C. Jolley
Kirsten C. Jolley
Patent Examiner
Technology Center 1762